

Freshwater Collaborative of Wisconsin

Presentation to the Speaker's Taskforce on Water Quality

J. Val Klump, Dean School of Freshwater Sciences, UW-Milwaukee,
July 11, 2019

Moving Wisconsin and the World Forward

Capitalizing on Wisconsin's
Leadership in **Freshwater**

Finding Solutions & Developing the Workforce



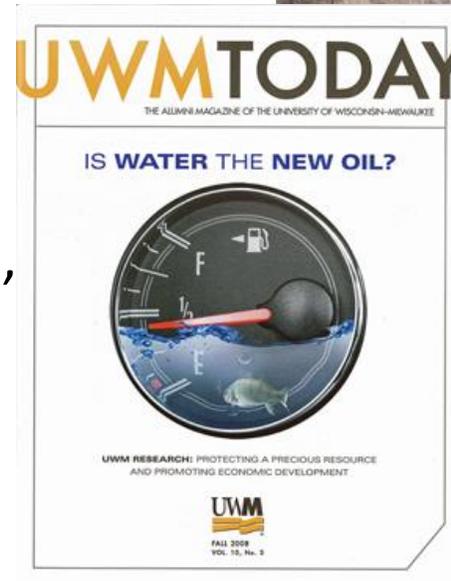
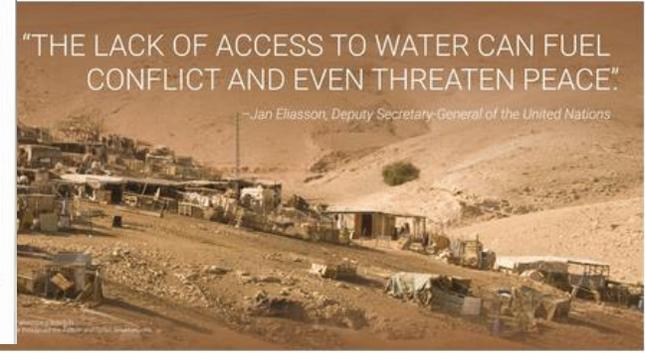
Water → a **global** issue:

- Single greatest resource challenge of the 21st c
- Water sector global economy → \$500B/yr
- \$23T to deal with supply, aging infrastructure, and global change by 2030¹

and a **Wisconsin** issue:

“Every Wisconsinite should have access to safe, clean drinking water.” Speaker Robin Vos

“2019 is the Year of Clean Drinking Water in Wisconsin.” Governor Tony Evers



¹ Water Matters: Venture Investment Opportunities in Innovative Water Technology, Artemis Project 2008

Wisconsin's Water Industries



Agriculture



Commercial Fisheries



Energy Production



Manufacturing



Mining



Recreation and Tourism



Shipping

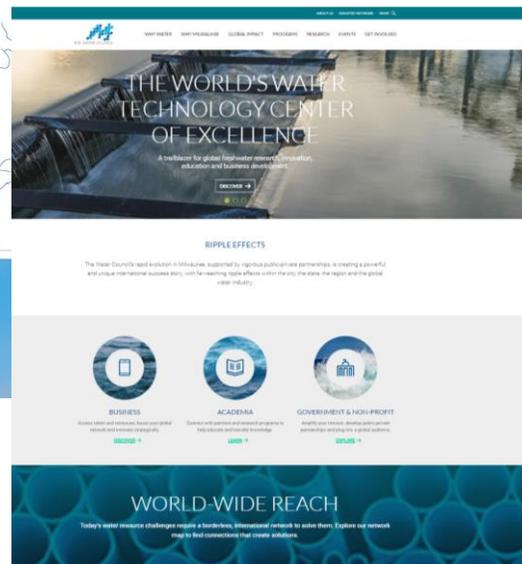
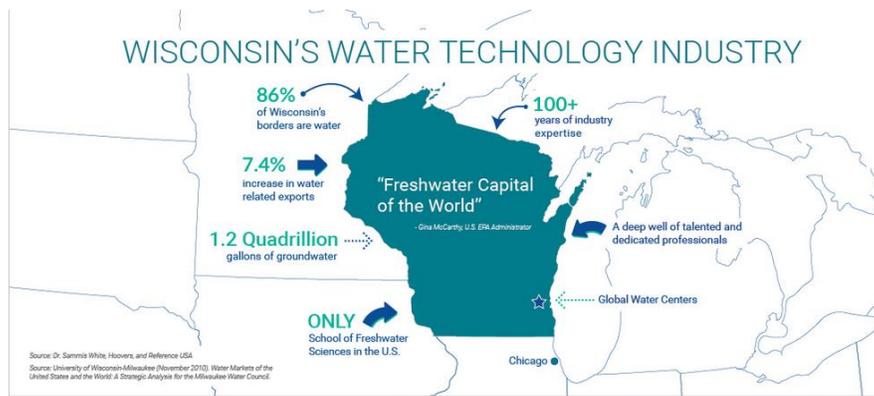


Water Infrastructure



Water Technology

Meeting Wisconsin's Needs: Freshwater is tied to economic development and workforce development.



WATER TECHNOLOGY

WATER TECHNOLOGY EXPERTISE RUNS DEEP IN WISCONSIN

With the two largest Great Lakes—Lake Michigan and Lake Superior—and the Mississippi River forming three of Wisconsin's borders, plus 15,000 lakes within the state's boundaries, Wisconsin has made the most of its unique geography to build core industry strengths that draw upon abundant fresh water. And tapping this precious natural resource to create commercial activity and improve the lives of our citizens, we've also learned to treat it with the respect it deserves. When it comes to using water in a sustainable manner, Wisconsin possesses world-leading knowledge based on a long history of innovation.



The concentration of global water industry leaders and the presence of [The Water Council](#) in Wisconsin have bolstered a reputation for the state as an authority on water technology advancements. Milwaukee is one of only two North American cities in the elite list of 13 worldwide United Nations Global Compact Innovating Cities (UNGCCP) and the only one in the world focused on the full cycle of water.

- >> [Forbes article on Milwaukee's globally recognized success as a water technology Mecca](#)
- >> [Read about The Water Council's U.S. Small Business Administration's innovation cluster grant.](#)
- >> [Learn more about The Water Council's JPMorgan Chase & Co. grant.](#)



Email Coleman Peiffer or call him at 608.210.6714 to learn more about the business opportunities and perfect Wisconsin location for your next project.

MARKETPLACE: ONCE FAMOUS FOR BEER, MILWAUKEE NOW BETS ON WATER

Read the Marketplace report on the growing cluster of Milwaukee companies dedicated to solving the world's water woes.

WALKER'S POINT NEIGHBORHOOD ECONOMIC INVESTMENT ANALYSIS

Download the complete report on the impact of economic investments in Milwaukee's water technology district.

INDUSTRY PROFILE

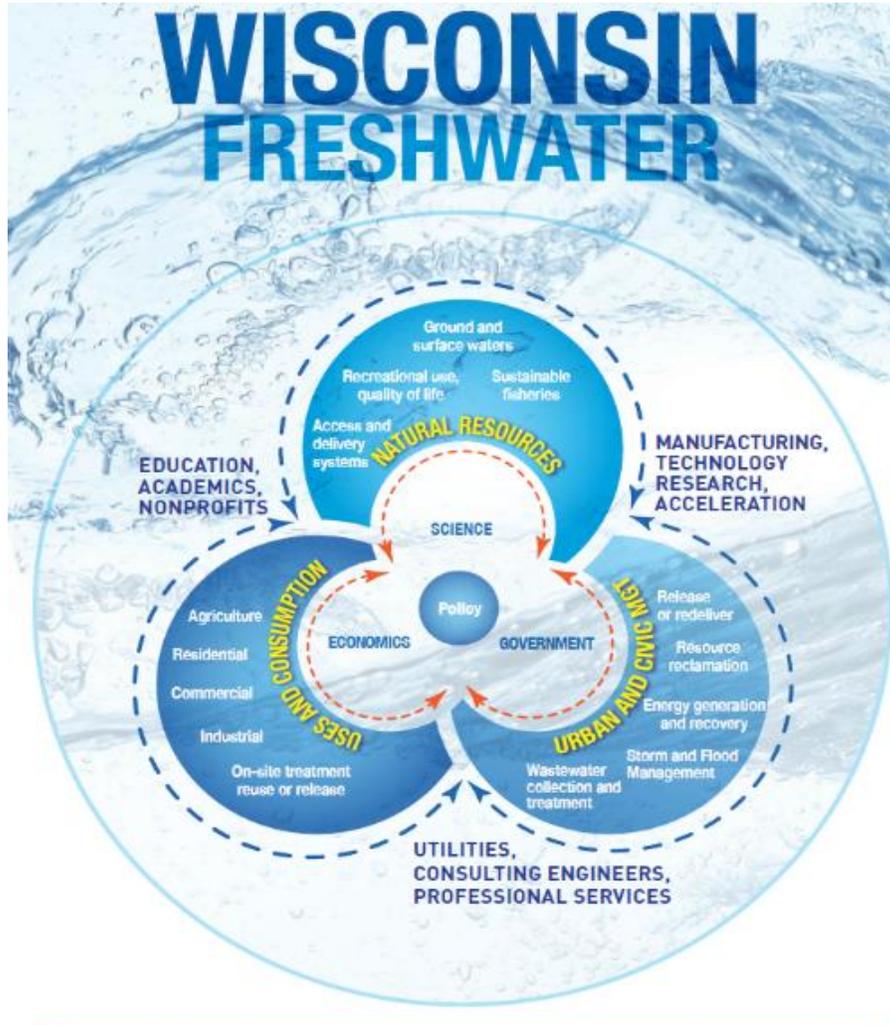
Download the complete report on water technology advancements in Wisconsin.

37k employed

❖ **The silicon valley of freshwater**
Leadership as a Water-Centric region

- the **premier water cluster in NA**
- Economic development thru 2016
→ \$500m





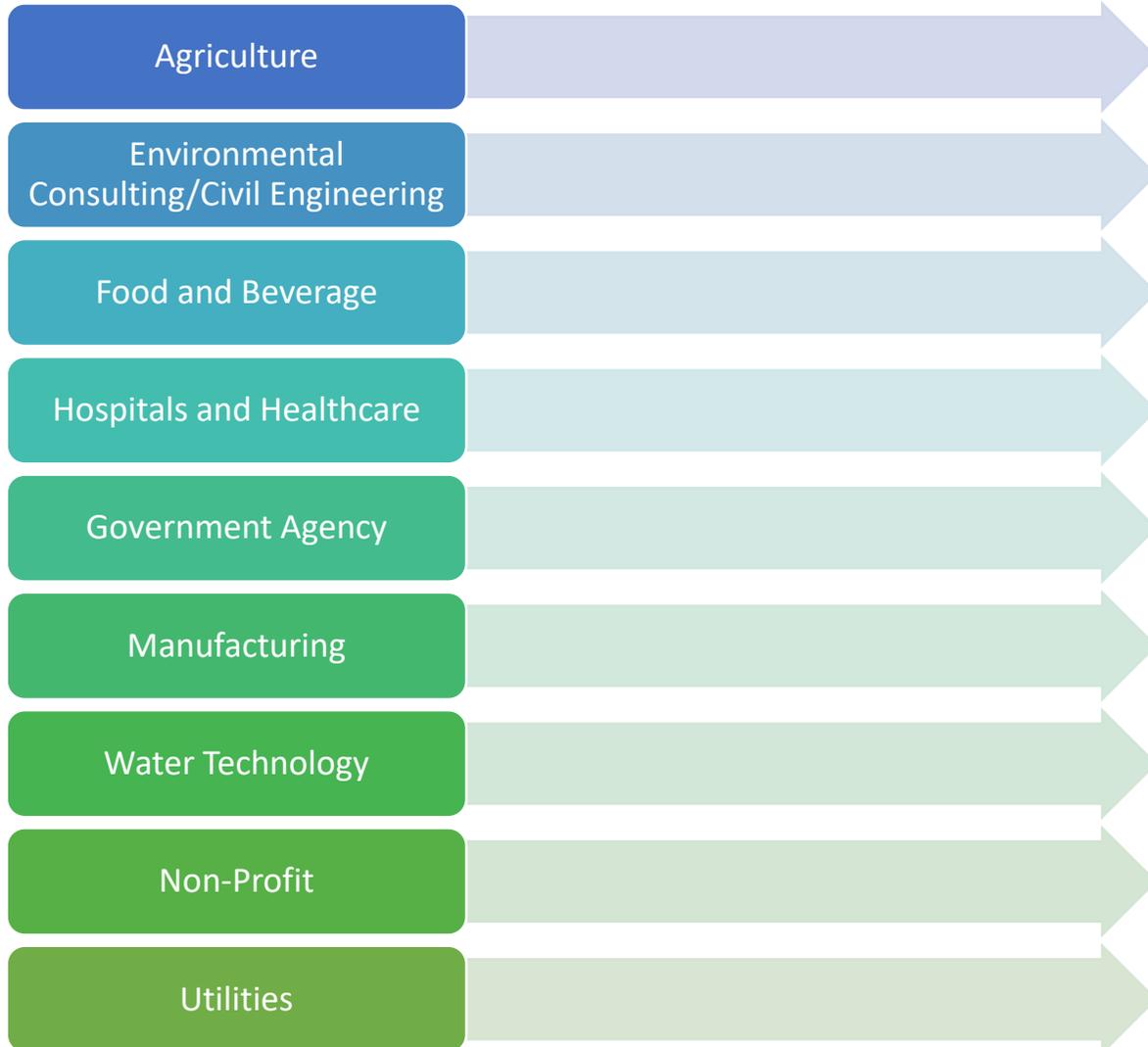
Demand for a workforce

- 78% of all jobs globally are water-dependent (UNESCO)
- Fastest growing sector of world economy
- **Wisconsin industries are facing significant workforce shortages**
- **Survey = 68% of WI water sector employers struggle to find well prepared employees**
- The number of college-age Wisconsin residents is declining. Eighteen of the 29 most common occupations that require a BA/BS or higher had fewer Wisconsin grads in 2016 than the estimated number of water sector job openings available.

2017 Water Sector Employer Survey

Conducted in
Summer 2017

114 Respondents
Completed Survey



new hires required **extensive training** in water-related issues, technologies or processes.

A plurality **favored water-focused degree** programs with specializations.

water-related positions were a **growth area** in their organizations ~ 50%

Careers in the water sector make up 2% of the state's workforce

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EPA warns of aging workforce within water industry

VIDEO: Lack of Environmental Protection Agency workers



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Marinette 7pm 81 Sunny 10pm 71 Clear 7am 66 M Sunny

By Brittany Schmidt | Posted: Wed 5:06 PM, Jun 26, 2019 | Updated: Wed 6:18 PM, Jun 26, 2019

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GREEN BAY, Wis. (WBAY) -- "If we don't take the time to train, diversify the workforce and bring in the next generation of water and waste-water treatment operators, the people who protect us every day, are not going to be there in 10-15 years," said David Ross, assistant water administrator with the Environmental Protection Agency.

"If we don't take the time to train, diversify the workforce and bring in the next generation of water and waste-water treatment operators, the people who protect us every day, are not going to be there in 10-15 years."

"The money we throw in to build infrastructure, if you don't have the workforce to run it, you are not protecting those taxpayer investments."



David Ross, Asst. Administrator, USEPA Office of Water

Freshwater Collaborative of Wisconsin

- A System-wide, one-of-a-kind network of undergraduate programs in Freshwater
- Solution-focused research on Wisconsin's (& the world's) water issues

- ! *Unleash UWS collective assets*
- ! *Elite program of training and research*
- ! *Launch talent development multidisciplinary course of study across UW campuses.*



New Educational Pipelines

Elements of a System-wide FCW:

- **Interdisciplinary** – by nature of the subject –
- **Multiple pathways** ~ focus of course of study
- Maximizes & capitalize on the **strengths of each campus**
- Highly **Individualized** ~ student chooses a path to degree
 - Combination of
 - **Flexibility** – individually designed based upon students' interest
 - **Core requirements** – rigorous standards, areas of competency, demonstration of achievement
 - **Seamless**: no impediments to curriculum/coursework/credit across System.
 - Admission to one is admission to all
- **Uniqueness** – stands out from existing programs at other Institutions
- **Keep, Attract & Grow talent** – global recruitment & local retention
- **Leverage WI's assets**



FRESHWATER COLLABORATIVE CONCEPT MAP

- UG Scholarships
- Common Core competencies
- Required Cross-campus experiences
- Specialized Institutes



- Research collaboration networks
- Attracting funding & Investment to WI
- Shared Facilities/Resources
- Grad & UG Traineeships & RE

- One Brand supporting all programs
- Recruiting and Marketing staff
- Targeting new markets
- WI as a Water Training destination

- Create the “Silicon Valley of FW”
- Foster internships & work study
- Student Chapters
- Advisory Boards & Engagement
- Workforce development for the Blue Economy



PROGRAMS AND RESOURCES THAT SPUR ECONOMIC PROSPERITY IN WISCONSIN

Timing for leveraging our state's competitive advantages has never been better and Wisconsin has a unique opportunity to be a global player in **water.**



TARGETED INDUSTRY PROJECT

This program supports industry cluster and sector development in the state of Wisconsin.

Workforce development is the most critical ingredient for growing Wisconsin's competitive advantage in the global water economy.

~\$335,000/yr for 2 years – matched by \$1.4M from UWS
Goal: kick start the FCW



[Learn More](#)

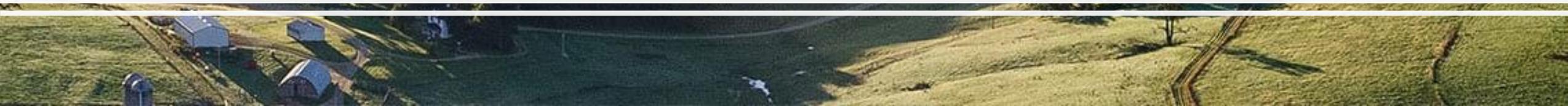
Appendix Briefs: Strengths and Assets of UW System

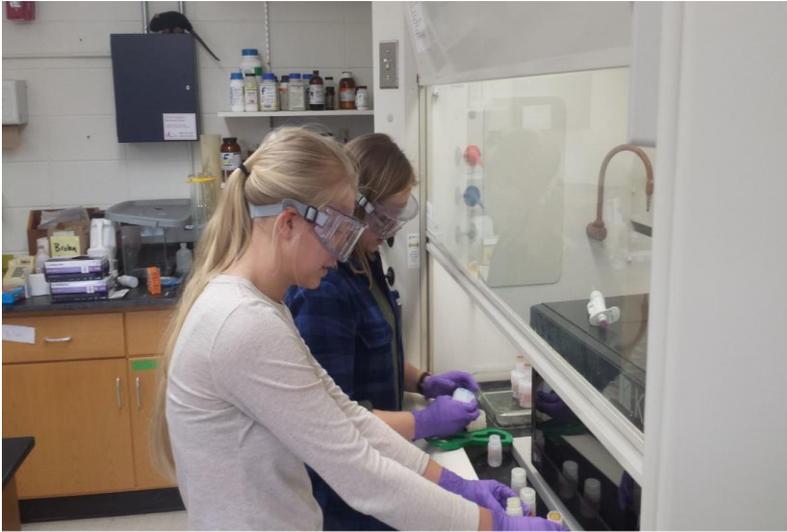




**WE GROW
BIG IDEAS**

THANK YOU





University of Wisconsin Eau Claire



Assets

- Department of Geology
- Materials Science and Engineering
- Department of Biology
- Watershed Institute
- Department of Chemistry
- Department of Geography

Strengths

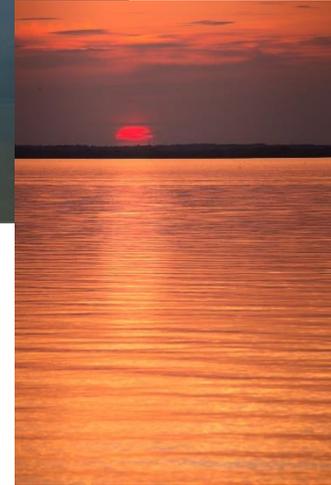
- Surface and Ground Water Chemistry
- Environmental Pollutants
- Industry Collaborations
- Water Quality and Emerging Contaminants
- Creation of Bathymetry Maps (GIS)



UNIVERSITY of WISCONSIN
GREEN BAY



Photo by U.S. Army Corps of Engineers,
Detroit District



Assets

- 420 miles of coast connecting campuses in four coastal cities
- Established programmatic strengths addressing coastal resources
- Deep history of community-focused education & research partnerships
- NERR initiative & relevant centers (e.g. CCB, EMBI)

Strengths

- Great Lakes Coastal Science, Restoration, & Management
- Watershed Management & Restoration
- Water Quality Safety & Emerging Contaminants
- Agricultural Water Management





UNIVERSITY *of* WISCONSIN LA CROSSE



Assets

- River Studies Center
- Upper Midwest Science Center (USGS)
- Prairie Springs Science Center
- Research boats on Mississippi River

Strengths

- River Science
- Aquatic Contaminants
- Nutrient Dynamics
- Invasive Species



Water  UW-Madison

100 affiliated faculty/scientists

College of Agricultural and Life Sciences

- Community and Environmental Sociology
- Forest and Wildlife Ecology
- Biological System Engineering
- Soil Science
- Agronomy
- Life Sciences Communication
- Entomology
- Bacteriology
- Agricultural and Applied Economics
- Horticulture

College of Engineering

- Materials Science and Engineering
- Civil and Environmental Engineering
- Engineering Professional Development

Other schools/units

- Art Department
- Dance Department
- School of Veterinary Medicine
- Wisconsin Geological and Natural History Survey
- Geological Engineering
- Nelson Institute for Environmental Studies
- Center for Limnology
- Aquatic Sciences Center/Sea Grant
- State Lab of Hygiene
- Wisconsin Institute for Discovery
- UW-Extension
- Center for Climatic Research
- Center for Sustainability and the Global Environment

College of Letters and Science

- Geoscience
- Center for Limnology
- Geography
- Integrative Biology
- Botany
- Atmospheric and Oceanic Sciences
- Planning and Landscape Architecture
- English
- Computer Sciences
- Anthropology
- Chemistry

Assets



- Aquatic Sciences Center
- Center for Limnology
- Water Science and Engineering Lab
- Diverse water-focused graduate degree programs
- Many large interdisciplinary water-focused research initiatives
- Water@UW-Madison: 100+ faculty/PIs with diverse interests in water

Strengths



- Watershed/Ecosystem Management and Restoration
- Water Quality and Emerging Contaminants
- Water Treatment, Infrastructure, and Engineering
- Agricultural Water Management



Assets

- School of Freshwater Sciences
- College of Engineering & Applied Science
- Water Technology Accelerator
- Great Lakes Research Fleet
- Endowed Centers for Water Policy & GL Genomics
- NSF IUCRC Water Equipment & Policy Center

Strengths

- Great Lakes/Coastal Ecosystem Management
- Water Quality & Environmental Toxicology
- Strong Groundwater and Atmospheric Expertise
- Existing Industrial Collaborations
- Sensor development & observing systems

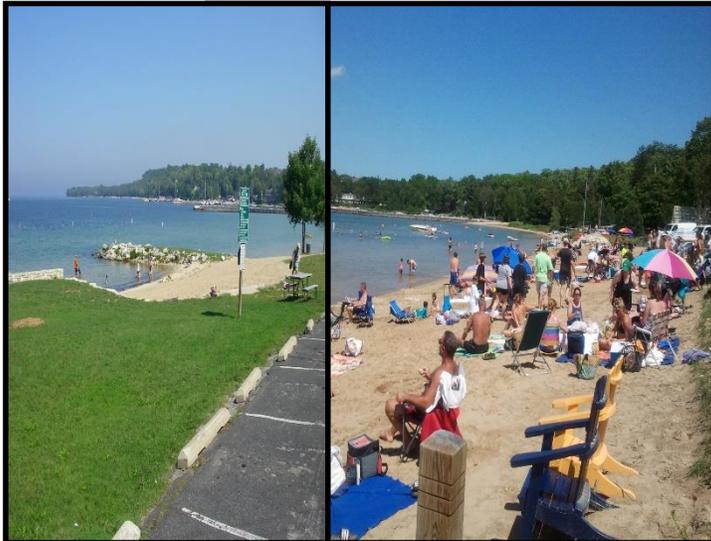


UNIVERSITY OF WISCONSIN OSHKOSH



Before

After



Assets

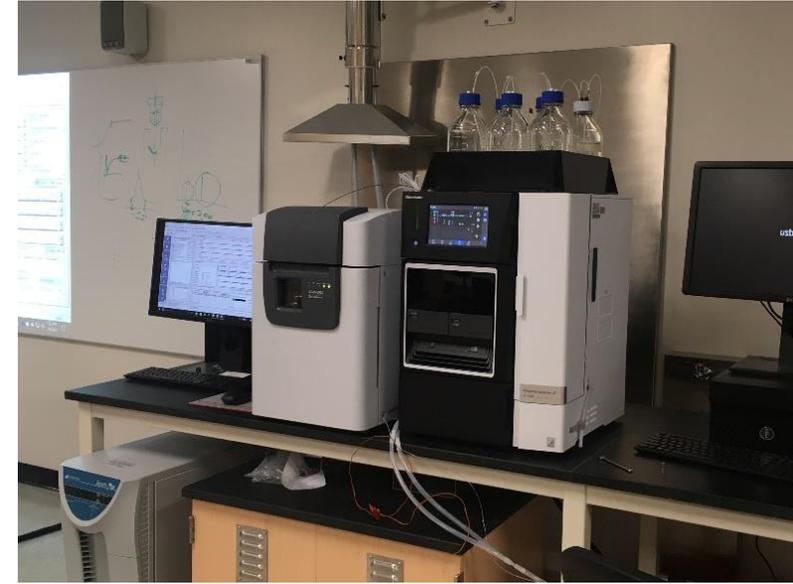
- Environmental Research and Innovation Center (ERIC) – State Certified Lab
- Water testing labs and long-term research sites in Oshkosh, Eagle River, Sturgeon Bay, and Manitowoc.
- Educational programs related to water in Environmental Engineering Tech., Biology, Geology, Chemistry, etc..
- Research Boat with lab and ramp access to the Lake Winnebago System
- Multiple research labs in several departments actively conducting water research.
- BS and MS programs in water related areas

Strengths

- Recreational water and sustainable stormwater treatment technology
- Field site access to water rich areas of WI
- Access to 50+ paid water-related internships per year.
- Multidisciplinary educational programs



UNIVERSITY OF WISCONSIN
PARKSIDE



Assets

- SC Johnson Integrated Science Lab
- GIS/Spatial Analysis Lab
- Outdoor laboratory with access to aquatic habitats and infrastructure
- Root River Environmental Education Community Center (REC)
- Center for Environmental Education, Demonstration, and Applied Research (CEDAR)

Strengths

- Biomonitoring, restoration, remediation, and habitat management
- Hydrology and water quality
- Community-based learning and partnerships
- Outreach through REC and CEDAR

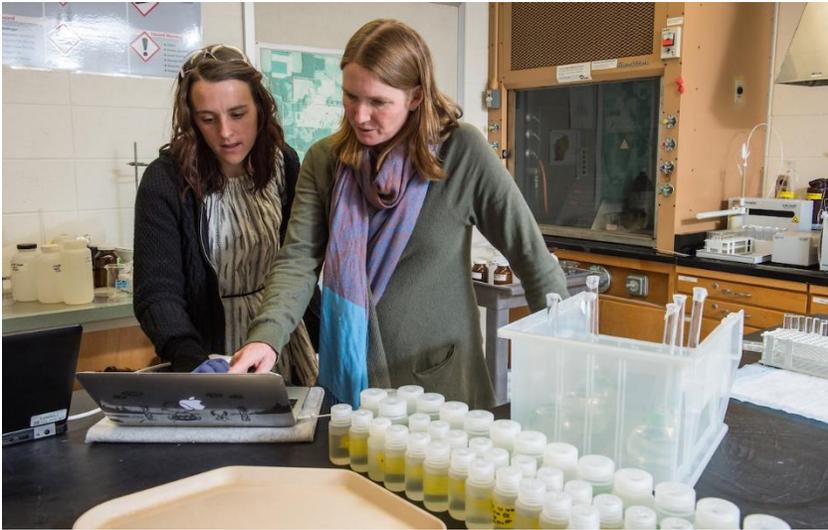


Assets

- Pioneer Farm
- Tree-Ring, Earth, and Environmental Sciences Laboratory
- Fluid Mechanics Laboratory
- Geotechnical Engineering Laboratory
- Small watersheds in a rural/ag setting
- Unique Driftless Area landscape

Strengths

- Engineering and agriculture
- Broad spectrum of stream and lake research
- Water infrastructure, waste management, and technological applications
- Groundwater and surface runoff



UNIVERSITY OF
WISCONSIN **River Falls**
GLOBAL. INNOVATIVE. EXCELLENT.



Assets

- Heart of St. Croix Basin
- Campus Trout Stream
- Engaged Watershed Community
- Campus Groundwater Well Network
- Urban-Rural Interface
- Strong UW Extension Partnership

Strengths

- Undergraduate Research Emphasis
- Multiple Agricultural Programs
- Water-focused Curriculum
- Broad Water Management Expertise



College of Natural Resources
University of Wisconsin - Stevens Point



Assets

- **3rd Largest Water Resources Program in Nation (Undergrad majors)**
- Largest College of Natural Resources in Nation
- 50 years of Water Majors
- USGS WI Cooperative Fishery Unit
- Aquaculture & Aquaponics Facilities
- UW Extension-UWSP Partnership

Strengths

- Fisheries & Aquatic Sciences
- Water Quantity and Quality
- Great Lakes & Watershed Management & Restoration
- Aquaculture/Aquaponics





UNIVERSITY OF WISCONSIN
STOUT
WISCONSIN'S POLYTECHNIC UNIVERSITY



Assets

- NSF-funded LAKES REU
- Center for Limnological Research and Rehabilitation
- Tainter-Menomin Lake Improvement Association
- Existing relationships with Wisconsin DNR, MN Pollution Control Agency, US Geological Survey, Army Corps of Engineers

Strengths

- Polytechnic designation
- Interdisciplinary focus
- Program Advisory Boards
- Programs in Environmental Science, Applied Social Science and Conservation Biology



Assets

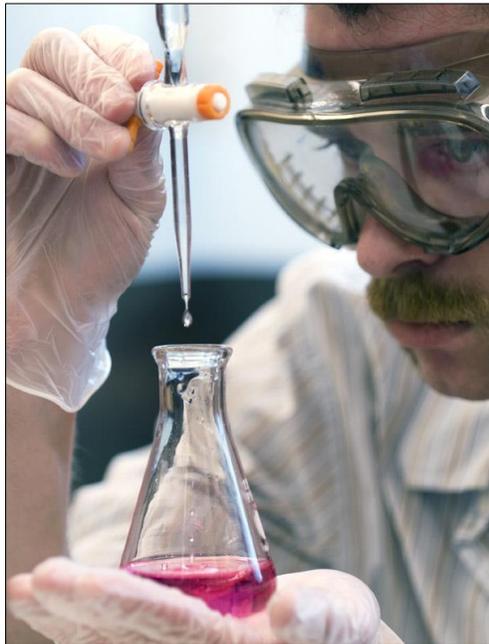
- Lake Superior
- Lake Superior Research Institute
- Great Lakes Maritime Research Institute
- Transportation and Logistics Research Center
- Educational focus areas: aquatic biology, fisheries science, chemistry, environmental science

Strengths

- Aquatic Invasive Species Research and Education
- Water and Human Health
- Watershed management and planning
- Environmental toxicity testing



University of Wisconsin Whitewater



Assets

- Institute for Water Business
- Fiscal and Economic Research Center
- Modern Instrumentation Lab
- Microscopy Lab
- Animal Care Facility
- GIS Center

Strengths

- Water Business, Law and Finance
- Water Quality, Safety and Emerging Contaminants
- Watershed Management and Restoration
- Community Engagement

Speaker's Taskforce on Water Quality, June 11, 2019

Presenters for Testimony on behalf of the Freshwater Collaborative of Wisconsin:

- **Eric Leaf**, Assistant Dean for Advancement, School of Freshwater Sciences, University of Wisconsin-Milwaukee
- **J. Val Klump**, Dean and Professor, School of Freshwater Sciences, University of Wisconsin-Milwaukee
- **Laurie Parsons**, Senior Vice President – Environmental Science and Engineering, Growth Team, Ramboll Group
- **Jessica Orlofske**, Assistant Professor – Biology, UW-Parkside
- **Elisabeth Harrahy**, Associate Professor – Biology and Toxicology, UW-Whitewater